



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,886	03/31/2004	Ligang Zhang	026-0047	5768

22120 7590 09/22/2006

ZAGORIN O'BRIEN GRAHAM LLP
7600B NORTH CAPITAL OF TEXAS HIGHWAY
SUITE 350
AUSTIN, TX 78731

EXAMINER

LEE, EDDIE C H

ART UNIT	PAPER NUMBER
----------	--------------

2811

DATE MAILED: 09/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/813,886

Applicant(s)

ZHANG ET AL.

Examiner

Eddie C. Lee

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 and 22-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 22-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>Jun. 28, 2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 9 and 32 do not make sense. Claims 1 and 24 specifically recite that the “electrically conductive enclosure electromagnetically shielding the inductor, the electrically conductive enclosure having a aperture at least as large as the inductor.” Therefore, an “omission” of the enclosure results in the “omission” of the aperture at least in terms of the metes and bounds of the claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6, 7, 9, 16-20, 22-27, 29, 30, 32, 39-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang et al.

Regarding claims 1, 23, 24 and 42, in Figs. 4a and 4b, Huang et al. discloses an apparatus comprising an inductor 11, and electrically conductive enclosure

41electromagnetically shielding the inductor, the electrically conductive enclosure 41 having an aperture at least as large as the inductor as shown in Fig. 4a, the aperture being substantially centered around a projected surface 22 of the inductor, and one or more conductive links 42, 43 extending across the aperture and electrically coupled to the electrically conductive enclosure.

Regarding claims 2 and 25, Figs. 4a and 4b show the aperture being substantially parallel to a plane of the current flow of the inductor.

Regarding claims 3 and 26, Fig. 4a reasonably shows the aperture having an approximate diameter that is the sum of the approximate outer diameter of the inductor and the approximate inner diameter of the inductor.

Regarding claims 4 and 27, in at least paragraph 0012, Huang et al.'s enclosure, including the links "reduce an effect of electromagnetic signals external to the electrically conductive enclosure on the inductor."

Regarding claims 6, 7 and 29, in at least paragraph 0038, Huang et al. discloses the links 42, 43 "are approximately 5 μm wide," and are formed in at least one so-called "traditional integrated circuit layers."

Regarding claims 16 and 39, the term "redistribution" layer reads on any layer of an integrated circuit die since this terms does not set forth any particular structure. On the other hand, any layer of an integrated circuit is considered a "redistribution" layer since each layer effects the movement of electrons.

Regarding claims 18 and 40, in paragraph 0035, Huang et al. discloses the conductor forming the inductor is 10 μm wide.

Regarding claims 19 and 41, in Fig. 4a, Huang et al. shows the space between inductor 11 and the edge of the aperture being approximately equal to the width of the enclosure 41. Since Huang et al. discloses the enclosure width to be up to 50 μm wide, it is reasonable to interpret the space as being more than 10.25 μm wide.

Regarding claim 20, the method steps recited herein are anticipated for the same reasons provided above for claim 1.

Regarding claims 44-54, in Fig. 4a, Huang et al. shows the conductive plate 41 formed by a plurality of continuous conductive patterns, the continuous conductive patterns being substantially concentric, consistent with applicant's disclosure, with respect to the aperture. The aperture is substantially centered around a projected surface 22 of the inductor, and the conductive links 42, 43 are readable as at least 4 separate links such that "individual ones of the electrically conductive links are coupled to each other by an electrically conductive link perpendicular to the individual ones of the electrically conductive links."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 15, 28 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al.

Regarding claims 5 and 28, the difference between Huang et al. and the claimed invention is “the electrically conductive links reduce coupling in the inductor from external sources by approximately 6dB.” However, this difference is nothing more than a design parameter of the apparatus. That is, depending on the need/specification of the apparatus or integrated circuit, one would design the inductor and enclosure, including the links, to meet this need/specification. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Huang et al. such that “the electrically conductive links reduce coupling in the inductor from external sources by approximately 6dB.” The ordinary artisan would have been motivated to modify Huang et al. in the manner described above for at least the purpose of minimizing electromagnetic interference between the inductor and the other elements of the of the apparatus or integrated circuit.

Regarding claims 15 and 38, the difference is “the inductor is formed at least partially in one or more layers of an integrated circuit die thicker than others of the metal layers.” This difference is again nothing more than a design choice of the apparatus. That is, forming an inductor on a metal layer that is thicker or thinner than other metal layer to vary the inductance of the inductor is an obvious design choice for the simple purpose of meeting specific needs or specification of the apparatus. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Huang et al. by forming “the inductor [] at least partially in one or more layers of an integrated circuit die thicker than others of the metal layers” in order to meet higher inductance need due to the thicker metal layer.

Claims 8, 10-14, 31, 33, 34-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. in view of Brennan et al.

The difference between Huang et al. and the claimed invention is “the electrically conductive enclosure includes a top plate, a bottom plate, and sidewalls.” However, Brennan et al. discloses an apparatus comprising an inductor 314 and an electrically conductive enclosure comprising a top plate, a bottom plate and sidewalls 302, 304, 326 and 328. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Huang et al. so that “the electrically conductive enclosure includes a top plate, a bottom plate, and sidewalls.” The ordinary artisan would have been motivated to modify Huang et al. in the manner described above for at least the purpose of completing surrounding the inductor thus minimizing electromagnetic interference between the inductor and the other elements above, below and to the side of the inductor.

Regarding claims 10 and 31, the term “bottom” is a relative term that does not distinguish the claim from Huang et al., as modified above.

Regarding claims 11, 12, 34 and 35, since the plates are conductive or metal, the plates are formed in “one or more integrated circuit metal layers.”

Regarding claims 13 and 36, the term “redistribution” layer reads on any layer of an integrated circuit since this term does not set forth any particular structure. On the

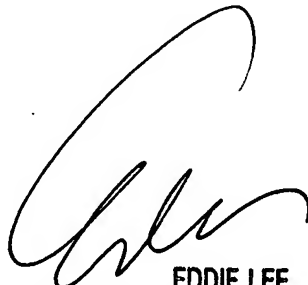
Art Unit: 2811

other hand, any layer of an integrated circuit is considered a "redistribution" layer since each layer effects the movement of electrons.

Regarding claims 14 and 37, any one of the plate is formed in a package substrate since it's part of a die which will be part of a package, especially one that is encapsulated.

Applicant's arguments with respect to claims 1-20 and 22-54 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to Eddie C. Lee at telephone number 571-272-1732.



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800